

## MASONS

Another aspect of building that flourished in Midway was that of masonry. Many men brought this skill with them when they came to the valley, while others learned it as they grew in Wasatch Valley.

Stone cutting and masonry were tedious jobs, done in the early days with hand tools only. One stone cutter is said to have worked ten weeks with hammers and chisels on a stone, only to have it crack and prove worthless for the job for which it was intended. Many men worked more than 10 hours a day in hard stone to earn three dollars' pay per day.

The Midway area had many quarries and rock fields, as well as a flourishing brick making industry. Much of the rock native to Midway was "pot rock" or limestone formed in warm springs of the area.

The old Co-op Store, church buildings, the school house, the Town Hall both the old and new and Thomas Hair's store are some products of the stone masons. Rocks in these buildings were chipped by hand to the proper size.

In the 1930's, when the present Town Hall was constructed, work had advanced to rock sawing. Stones were gathered from surrounding fields and brought to the masons. Work was measured in terms of "perch." Perch for ordinary labor was sixteen cubic feet of rock. It was 21 cubic feet for government measure. Stone from the fields of Joseph Galli, Joseph Shelton and John Zweifel went into the Town Hall, while the First Ward Chapel was constructed of rock obtained from John U. Buehler's pasture.

Masons of note through the years have included John Watkins, Joseph Watkins, Frederick Haueter Jr., Fred O. Haueter, Harry Bircumshaw, John Zweifel, John and Henry Van Wagoner, Johannes Sonderegger, Simon Huber, John Glassinger, George Watkins and Thomas Bonner.

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## BRICK MAKING

In the early years of Midway there were two yards for manufacturing brick. One yard and kiln was located northwest of the city and was operated by John Van Wagoner. The other location was on the southwest side of the city, just east of the cemetery. This was operated by Henry Van Wagoner and David Provost. The first brick in the valley was made by John Watkins. Another early brick-maker was William Van Wagoner.

Brick-making flourished in Midway because there were several large hills of clay available in the area.

Production techniques, though somewhat crude, produced good brick. The usual procedure began by digging a hole the size of a very

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IN THE SWEAT OF THY FACE . . .

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large room and filling this hole with water and clay. This mixture was allowed to soak overnight. Next morning, the mixture was transferred to a large wooden box which contained an apparatus referred to as a "dolly." The dolly actually was large mixing blades. The mixing device was powered by horses that plodded around the large box in a manner similar to old-time threshing of grain.

As the mud was being mixed, workmen would prepare wooden molds that were dipped in water and then in red sand. When the mud mixture was at the right consistency, it was taken from the mixing box, put into the wooden molds and leveled. These raw brick were then stacked with air space between each brick. Among the piles of brick, fire boxes or trenches were built, running about two feet apart. Fires were built in these trenches and kept burning continuously for three days and nights, or until the bricks were dry.

Indicative of the hard work involved in making brick is this note from the books of Henry Van Wagoner. Mr. Van Wagoner kept the time of his employees in a note book, and wrote after the name of one man: "One very, very hard days work for Henry Van Wagoner for only two dollars."

The Midway brick yards operated for many years, furnishing materials for such buildings as Wasatch High School which was built in 1912; homes such as the Nelson's by the railroad tracks, Bonner's, James Ritchie's in Charleston, Streets, George Johnson's and Coleman's. The Henry T. Coleman home built by John Watkins is said to be the first brick house built in the valley.

Some of the more prominent brick makers through the years have been David Provost, Theophilus Epperson, Amos and Lawrence Epperson, Louis Coleman and E. Luke Provost.

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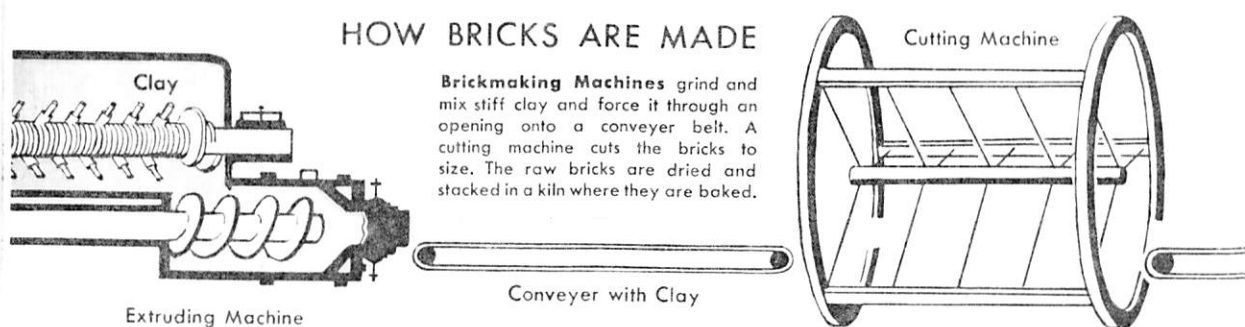
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## HOW BRICKS ARE MADE



**Brickmaking Machines** grind and mix stiff clay and force it through an opening onto a conveyer belt. A cutting machine cuts the bricks to size. The raw bricks are dried and stacked in a kiln where they are baked.

clay. Sometimes air is removed from the clay by attaching a vacuum pump to the brickmaking machine. Removing air makes the clay stronger and easier to handle.

**Soft-Mud Process** is used for all handmade brick. Molds are dipped in sand or water to prevent the clay from sticking. Water and clay are mixed to make a soft paste, which is pressed into the molds.

**Dry-Press Process.** Almost perfect *face* brick, the brick used on exposed walls, is obtained by this method. Only enough water is added to the clay to make it damp. The clay is then pressed into molds.

**Drying.** After the bricks have been formed, they are stacked in drying rooms. Air heated to temperatures from 100° to 300° F. (38° to 150° C) circulates through the drying rooms. The heated air removes much of the water. The bricks are dried slowly to prevent extensive shrinking and cracking. Drying may take from one day to six weeks, depending on the amount of water in the clay.

**Burning or Firing.** When the bricks are dry, they are stacked in ovens called *kilns*, which are heated by burning coal, oil, or gas. The temperature in the kiln is increased slowly until it reaches 1600° to 2000° F. (871° to 1100° C) or higher, depending on the kind of clay used. The clay particles become partly melted and fuse together, making the brick hard and strong.

**Vitrified bricks** are so well burned that they will not absorb water when they are soaked. *Medium-burned bricks* absorb some water, and *soft-burned bricks* absorb much water. Clays that are high in iron compounds make red brick. Clays with a low iron content are used for yellow or cream-colored brick. Variations in color can be obtained with some clays by *flashing* the brick at the end of the burning. In flashing, the fires are made very smoky to make the iron in the clay darker.

**Kilns** for burning bricks are either the periodic or continuous type. *Periodic kilns* are usually round and

have a domed top. They are filled, fired, and then emptied. The simplest kind of periodic kiln is made by stacking the unburned bricks to form rows of arched holes or tunnels. The fires, built in the holes or tunnels, pass upward through the bricks. The outside wall is sealed by plastering it with mud.

**Continuous kilns** may be of the chamber or car-tunnel types. The *chamber kiln* is formed by a number of periodic kilns placed in line. There is a single firebox located outside the kilns, and flues conduct the heat to the individual chambers. Heat for any individual chamber can be turned on or off at will. Thus, it is possible to have many stages of firing and cooling going on at the same time in different chambers. The *car-tunnel kiln* consists of a long tunnel divided into three chambers, one for preheating, one for firing, and one for cooling. The bricks are placed on cars that are pushed through the tunnel, stopping in each chamber. Thus, the bricks are gradually heated and cooled as they move through the tunnel.

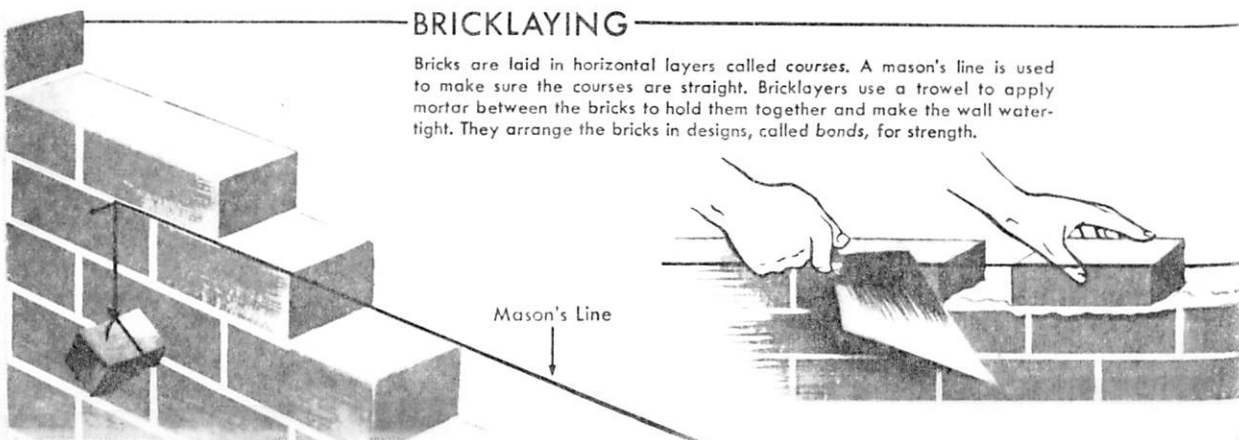
### Kinds of Brick

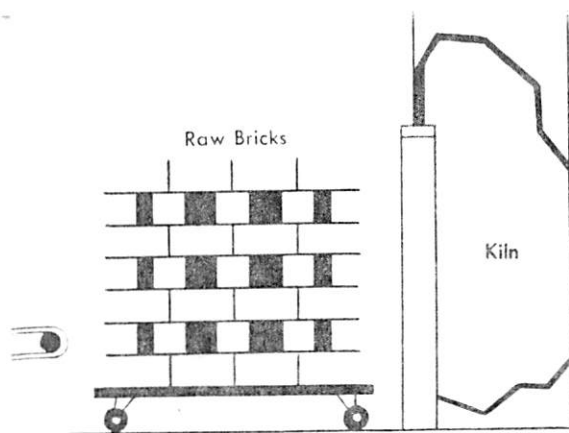
**Styles.** Clay and shale bricks of various colors are produced for use as *face brick*, to be used on the exposed face of a wall. *Common brick* (*backing brick*) is used mainly for the backs of walls. *Firebrick* (*refractory brick*) is used to line furnaces and kilns because it withstands high temperatures.

Face bricks may be smooth or their exposed areas may be roughened by *wire cutting* (scratching), as in *tapestry brick*. Manufacturers make smooth-faced *glazed bricks* that are glazed by being exposed to gases produced by throwing salt into the fires of the kiln. *Enameled bricks* are made by coating the surface of smooth, unburned clay brick with a material that melts to a glass when the bricks are fired. Enameled bricks have a smoother surface than salt-glazed bricks and

## BRICKLAYING

Bricks are laid in horizontal layers called *courses*. A mason's line is used to make sure the courses are straight. Bricklayers use a trowel to apply mortar between the bricks to hold them together and make the wall water-tight. They arrange the bricks in designs, called *bonds*, for strength.





cost more. Builders find them suitable for swimming pools and other places where wall tile might be used.

**Sizes.** At one time, bricks were made in various sizes and shapes, depending on the locality in which they were made. In the United States the standard size for common brick is  $2\frac{1}{4}$  inches (5.7 centimeters) thick,  $3\frac{1}{2}$  inches (9.5 centimeters) wide, and 8 inches (20 centimeters) long. Bricks cast to specified sizes and shapes are called *molded bricks* and are used for ornamental purposes, such as window trim, moldings, arches, and chimneys.

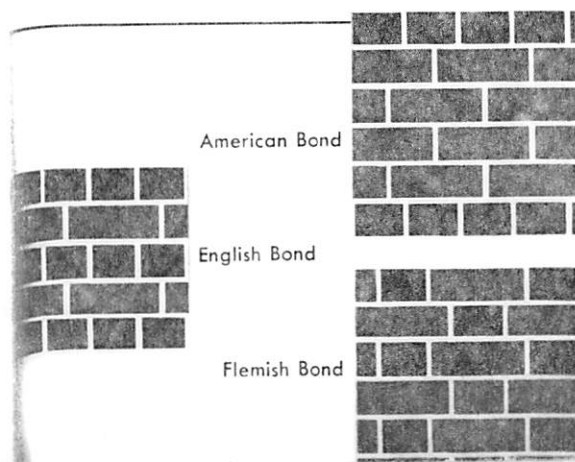
#### Bricklaying

Bricks usually are laid on their flat sides to form *courses* (horizontal layers) separated by *mortar joints* from  $\frac{1}{8}$  to  $\frac{1}{2}$  inch (3 to 13 millimeters) thick. A *bricklayer*, who puts the bricks in place, is assisted by a *hod carrier*, who delivers bricks and mortar to the bricklayer. The construction formed is called *brickwork* or *brick masonry*.

**Bonding.** Bricks are arranged so that they lap over each other to stagger the vertical joints. Thus, it is possible to distribute loads over a large area. The various arrangements are called *bonds*. Bricks laid with the ends exposed are called *headers*. Those laid with the sides exposed are called *stretchers*. The various bonds consist of different arrangements of headers and stretchers.

In *running bond* (*stretcher bond*), all the bricks are stretchers. *Common bond* (*American bond*) consists of four to six stretcher layers between single header layers. *English bond* consists of alternate courses of headers and stretchers. The joints in alternate courses line up vertically. In *Flemish bond*, each course consists of alternate headers and stretchers, with the headers centered on the stretchers of the courses above and below.

**Mortar** is used between bricks to form joints. The mortar secures an even bearing, holds the bricks in position, and makes a tight wall. The mortar usually



#### BRIDE, SAINT

contains portland cement for strength, hydrated lime for workability, sand for economy and volume, and water for workability and the necessary chemical reactions. A commonly used mortar consists of one part portland cement, one part hydrated lime, six parts sand, and enough water to make the mixture soft and workable. See CEMENT AND CONCRETE.

#### Preserving Brick

Brick construction will last hundreds of years if satisfactory materials and construction methods have been used. The brick also must be cared for properly. Weather will wear away the mortar from the joints and they should be repaired periodically. An unsightly whitish discoloration, known as *efflorescence*, sometimes appears on the brick. Efflorescence results when salts from within the brick and mortar are carried to the surface by water. The water evaporates, but the salts remain and cause the brick to chip and crumble. The deposits can be removed by scrubbing with diluted hydrochloric acid solution, then rinsing with plain water.

#### History

Brick is the oldest manufactured building material. Sun-dried brick was used in the Middle East by 6000 B.C. The chief occupation of the Israelites during their captivity in Egypt was making sun-dried brick from clay taken from the Nile River. In the United States, bricks were made in Virginia as early as 1612. Until the 1900's, brick was used to pave streets and sidewalks, and to build chimneys for industrial plants. But bricks have largely been replaced by concrete and asphalt for paving, and by steel for chimneys.

GEORGE W. WASHA

See also ADOBE; BUILDING TRADE; CLAY.

**BRICKER, JOHN WILLIAM** (1893- ), was the Republican candidate for vice-president of the United States in 1944. He and presidential candidate Thomas E. Dewey were defeated by President Franklin D. Roosevelt and Harry S. Truman. Bricker served as governor of Ohio from 1939 to 1945. He was elected to the United States Senate in 1946, and was reelected in 1952. Bricker was born in Madison County, Ohio. He received a bachelor's degree and a law degree from Ohio State University.

JAMES H. RODABAUGH

**BRIDAL WREATH** is a shrub that belongs to the rose family. It is found in temperate regions and grows about 6 feet (1.8 meters) high. It has slender, curving branches and dark green leaves that turn orange in autumn. The leaves are smooth and oblong and may have cut edges. The flowers bloom in April and May. These white flowers are about  $\frac{1}{4}$  inch (8.5 millimeters) across and grow in clusters. See also ROSE; SPIRAEA.

**Scientific Classification.** Bridal wreath is in the rose family, *Rosaceae*. It is classified as genus *Spiraea*, species *S. prunifolia*.

J. J. LEVISON

**BRIDALVEIL FALL** is one of the most beautiful sights of Yosemite National Park, Calif. The fall drops a misty curtain of water from a height of 620 feet (189 meters) of colorful rock. Sometimes the wind strikes the fall in such a way as to send sprays of water back over the cliff from which it fell. Then the fall seems like the veil of a bride. See also CALIFORNIA (picture).

**BRIDE, SAINT.** See BRIDGET, SAINT.

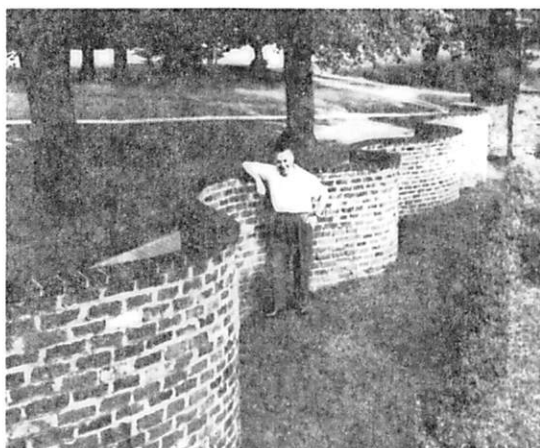
## BRICK

**BRICK** is usually made from clay or shale. It is a construction material that has been hardened into the shape of a block. Some brick is made of concrete, or of a mixture of sand and hydrated lime. Such brick is used in building walls.

Good building bricks are uniform in color and size, and have a pleasing appearance. They are free from cracks and irregularities. Well-made bricks produce a metallic ring when struck with a hammer. They have enough strength to resist crushing and bending, and absorb little water. They resist the action of fire and frost. Good bricks also *bond* (unite) well with *mortar*, the material used to join bricks in building.

### How Bricks Are Made

**Forming the Bricks.** After clay for bricks has been dug, it is crushed. Manufacturers then grind the clay thoroughly in a rotating pan with heavy rollers. This machine is called a *dry pan*. The clay is then screened to



Ewing Galloway

**Bricks** have been used for building since before the time of the ancient Egyptians. This fence, a fine example of the bricklayer's art, was designed by Thomas Jefferson. It stands on the University of Virginia campus and is called the *Serpentine Wall*.

remove the coarse material. Water is added to the clay, and revolving knives chop and mix the clay into a plastic mass. This mass is molded into bricks by (1) the stiff-mud, (2) the soft-mud, or (3) the dry-press process. The important difference in these methods is the amount of water used. After the bricks are formed, they are dried and then *fired* (burned).

A mobile brick factory has been invented. The brick-making machine is mounted on a truck, and is operated by the truck's engine. The apparatus scrapes clay from the ground, mixes it, and forms it. The machine smooths the ground as it goes along, and the bricks are stacked there to dry in the sun.

*Stiff-Mud Process* is used to make most building bricks. Water is added to the clay to make it a stiff mud. The brickmaking machine forces the clay through an opening to form a long ribbon. The ribbon of clay is cut into brick sizes by a *brick cutter*, an apparatus with evenly spaced wires that slice through the stiff